BIRD

INSTRUCTION BOOK

TERMALINE®
Coaxial Load Resistor

model 8135

Model 8135 TERMALINE®
Coaxial Load Resistor

INSTALLATION - OPERATION
MAINTENANCE

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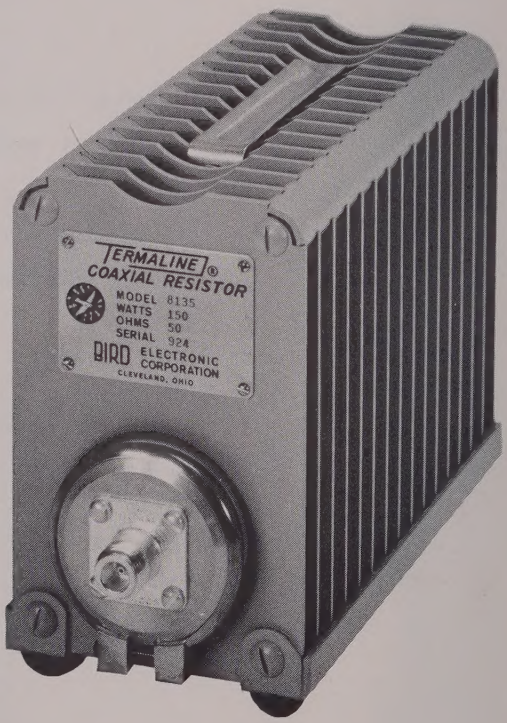

FIG. 1: View of Model 8135 TERMALINE® Load Resistor

SPECIFICATIONS

Frequency Range	dc to 4000 MHz
VSWR	1.1:1 max dc - 1000 MHz 1.2:1 max 1000 - 4000 MHz
Input Impedance	50 ohms nominal
Input Connector	Female N normally supplied
Load Power Rating	150 watts continuous
Ambient Temperature Range	-40°C to +45°C
Weight	6 pounds (2.7 kg)
Overall Dimensions	9-1/2" x 3-15/16" x 6-3/8" (241.3 x 100 x 162 mm)
Operating Position	Horizontal

SECTION 1
GENERAL DESCRIPTION

1.1 General

The Bird Model 8135 TERMALINE® Load Resistor is a portable, general purpose 50-ohm coaxial transmission line termination. It is a self-contained unit requiring no outside power source or additional equipment. This Coaxial Load Resistor provides an accurate, dependable, and practically non-reflective termination for adjustment, standby, and testing of transmitters under non-radiating conditions from dc to 4000 MHz.

The equipment is rectangular in shape with transverse cooling fins spaced evenly along its entire length. Mounting holes are provided. See Section 2, Installation.

The RF input connector, located on the front face of the unit, is a Female N. It is a special "Quick-Change" design permitting rapid and easy interchange with other Bird AN Type "QC" connectors. Refer to Section 5, Par 5.2a for procedure.

Typical "QC" connector Types available from the manufacturer are:

TYPE	PART NO.	TYPE	PART NO.
Female N	4240-062	Female UHF	4240-050
Male N	4240-063	Male UHF	4240-179
Female C	4240-100	Female BNC	4240-125
Male C	4240-110	Male BNC	4240-132
Female HN	4240-268	Female TNC	4240-156
Male HN	4240-278	Male TNC	4240-160

1.2 Theory of Operation

The Model 8135 TERMALINE Load consists essentially of a cylindrical film type resistor immersed in dielectric coolant. The resistor, individually selected for its accuracy, is enclosed in a special tapered housing which provides a linear reduction in surge impedance directly proportional to the distance along the load resistor. This produces the uniform, practically reflectionless line termination over the stated frequencies of the Load.

1.2 Theory of Operation (Continued)

The coolant oil is chosen for its desirable dielectric properties and thermal characteristics. Cooling of the Load is accomplished by natural fluid and air convection. The dielectric coolant carries the electrically generated heat from the resistor to the walls of the cylindrical cooling tank. The tank is encased in a set of heavy gauge metal radiating fins, which are firmly pressed on the cylinder. The heat from the oil is transferred to the surrounding air by the radiating fins.

A synthetic rubber diaphragm located in the rear dome of the Load allows the coolant to expand as the temperature rises.

SECTION 2

INSTALLATION

2.1 Location

Free air circulation around the Model 8135 TERMALINE Load is essential. Keep the Load in the clear, and do not place it near heated surfaces. The Model 8135 should have at least a 4-inch clearance on all sides. Keep the space above the unit unobstructed for good air circulation. This Load is to be mounted only in a horizontal position to insure that the load resistor will always be immersed in the coolant.

2.2 Fixed Mounting

The Model 8135 may be fastened to a work or test bench. To do this, remove the four rubber bumpers from the bottom of the radiator. These bumpers are fastened to the corners of the bottom radiator brace by #8-32 studs which are set permanently into the rubber feet. The bumpers unscrew easily by hand. The holes are threaded for 8-32 screws. The fasteners must be placed up through the bench and into the Load. These holes are on a 3 by 7 inch rectangle, (76 x 178 mm).

SECTION 3
OPERATION

Connect the Model 8135 TERMALINE Coaxial Load to the transmitting equipment under test with 50-ohm coaxial cable such as RG-213/U or equal, and a Male N Type plug (UG-21E/U or equal) which mates with the RF input connector of the Load. After the transmitter has been connected to the Load, proceed according to the transmitter manufacturer's instructions. When reconnecting the antenna, it may become necessary to re-adjust the transmitter due to possible differences in VSWR.

CAUTION

DO NOT operate the equipment over the rated 150 watts continuously.

SECTION 4
TROUBLESHOOTING

4.1 Periodic Inspection

With the rugged and simple construction of the Model 8135 TERMALINE Load, periodic inspection will be necessary at only about six month intervals. Inspection should include the items listed below:

a. Oil Leakage. Check for coolant oil seepage around the radiator tank, and particularly at the front and back around the under side of the clamping bands. See paragraph 4.2, Troubleshooting Chart, if leakage is observed. Check tightness of the clamping bands, both front and back.

b. DC Resistance. Check the condition of the load resistor by accurate measurement of the dc resistance between the inner and outer conductors of the RF input connector. Use a resistance bridge with an accuracy of one percent or better at 50 ohms (such as the Leeds & Northrup 5305 Test Set). The measured resistance should be nominal 50 ohms, ±2 ohms.

c. Inspect the Model 8135 TERMALINE for completeness and general condition of the equipment.

4.2 Troubleshooting Chart

The troubleshooting chart on page 6 lists the symptoms of commonly encountered troubles, causes, and suggested corrective measures. Use this chart as a guide when analyzing symptoms.

SECTION 5
MAINTENANCE

5.1 Operator's Maintenance

The principle maintenance required by the operator will be the cleaning of the RF input connector. If the insulator or metallic contact surfaces of the connector should become dirty or grimy, clean carefully with a dry cleaning solvent such as trichlorethylene or Inhibisol on a cotton swab stick. Keep the radiator of the Mod Model 8135 TERMALINE Load clean and free of dust.

CAUTION
Prolonged breathing of dry cleaning
solvents is dangerous.
Make certain adequate ventilation is provided.

If any portions of the radiator are corroded or rusted, clean the area carefully with a fine flint sandpaper, and touch up with gray enamel.

5.2 Repairs

There are no special techniques required for the repair or replacement of components in the Model 8135 TERMALINE Load. A screwdriver is the only tool needed. The paragraphs below outline component removal.

a. RF Input Connector Replacement. The input connector is a patented "Quick-Change" design which permits easy interchange with the use of only a screwdriver. This process does not interfere with the essential coaxial continuity of the Load Resistor RF input or the coolant oil seal. For replacement, proceed as follows:

(1) Remove the four #8-32 x 5/16" round head machine screws from the corners of the RF connector.

(2) Pull the connector straight out of its socket.

(3) Reverse the above procedure to install new connector. Be sure that the projecting center contact pin on the connector is carefully engaged and properly seated with the mating socket of the load resistor input.

b. Diaphragm and Coolant Oil. Remove the diaphragm to replace or examine the coolant oil. Replacement of the diaphragm and coolant oil are outlined in the following steps.

5.2 Repairs (Continued)

(1) Stand the Load vertically, with the back end up.

(2) Loosen the clamp screw until clamping band is released.

(3) Remove the diaphragm cover and lift diaphragm from back end of radiator tank.

(4) The coolant oil level should be about one inch below the top of the radiator cylinder. If the oil appears to be contaminated, replace.

(5) To reassemble, reverse the above procedure.

c. RF Load Resistor Assembly. To replace the load resistor assembly, proceed as follows:

(1) Stand Load vertically, connector end up.

(2) Loosen clamp screw until clamping band is released.

(3) Lift load resistor assembly straight up out of the cylinder, allowing the coolant to drip back into cylinder.

(4) Inspect the O-ring seal which is located just inside the mounting flange of the resistor assembly. DO NOT reuse the O-ring if deteriorated.

(5) To replace the load assembly, reverse the above procedure.

TROUBLESHOOTING CHART

Symptoms	Causes	Remedy
Leakage of coolant oil around clamping band or radiator housing.	Clamping bands not tight	Tighten slightly with a screwdriver
	Faulty O-ring (front)	Replace per paragraph 5.2c
	Faulty diaphragm (rear)	Replace per paragraph 5.2b
Overheating of the radiator	Transmitter power too high	Reduce transmitter power
	Coolant oil level too low	Add more coolant oil to the radiator per paragraph 5.2b
	Faulty RF	Replace per paragraph 5.2c
High or low dc resistance values per paragraph 4.1b	Faulty RF input connector	Replace per paragraph 5.2a
	Loose RF input connector	Tighten with a screwdriver
	Faulty RF Section Assembly	Replace per paragraph 5.2c

REPLACEMENT PARTS LIST

Quantity	Item	Part Number
1	RF Load Resistor Assembly	8130-015
1	Radiator	2400-025
1	O-Ring Seal	5-229
2	Clamping Band Assembly	7500-254
1	Diaphragm	2400-015
1	Cap, Diaphragm	2400-050
1	"QC" Connector, Female N	4240-062
	Coolant Oil 0.1 gal.	5-030-1 1 pt. container (.473 l)

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30303 AURORA ROAD
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